CLAIMS

1. A ceramic electronic component, comprising:

two or more electrodes spaced at a predetermined distance from each other, between which a potential difference is produced in operation and a void that penetrates to outside is provided,

wherein a water repellent film is formed in the void.

2. The ceramic electronic component according to claim 1, wherein the formation of an electrical path is prevented by the water repellent film.

3. The ceramic electronic component according to claim 1, wherein the void is at least one selected from a minute hole and a defect.

4. The ceramic electronic component according to claim 2, wherein the water repellent film is formed only in the void between the two or more electrodes.

5. The ceramic electronic component according to claim 1, wherein the water repellent film is formed of a residue resulting from a molecule of a coupling agent and has such a thickness as not to narrow the void by not less than 1 nm.

6. The ceramic electronic component according to claim 5, wherein the molecule of the coupling agent is bonded to a ceramic base material by a covalent bond.

7. The ceramic electronic component according to claim 5, wherein the molecule of the coupling agent has a portion containing a fluoroalkyl group

8. The ceramic electronic component according to claim 7, wherein the molecule of the coupling agent containing the fluoroalkyl group is a residue of perfluoroalkyl alkylsilane represented by the following general formula (Chemical Formula 1):

$$CF_3 - (CF_2)_n - R - Si(O -)_3 \qquad \text{(Chemical Formula 1).}$$

(n: 0 or an integer, R: a substituent containing an alkylene group, or a Si or oxygen atom)

9. The ceramic electronic component according to claim 7, wherein the molecule of the coupling agent containing the fluoralkyl group is polymerized.

10. The ceramic electronic component according to claim 1, wherein ceramic is formed by at least one selected from the group consisting of sintering after printing, sintering after sheet forming, vapor deposition, and sputtering.

11. The ceramic electronic component according to claim 1, wherein the two or more electrodes are buried in an inner portion of ceramic or integrated on the surface.

12. The ceramic electronic component according to claim 1, wherein the electronic component is a thick film ceramic electronic component including a ceramic layer and at least two electrodes, the ceramic layer being formed as a thick film on a base material.

13. The ceramic electronic component according to claim 1, wherein the electronic component is a composite inductor component including a ceramic sintered body and at least two conductive circuits.

14. The ceramic electronic component according to claim 13, wherein the composite inductor component has a porosity ranging from not less than 2% to not more than 30%.

15. The ceramic electronic component according to claim 1, wherein the electronic component is at least one selected from the group consisting of a multilayer ceramic capacitor, a varistor, a semiconductive ceramic capacitor, a ceramic thermistor, an inductor array, a common-mode choke coil, a micro-transformer, and a ceramic electronic substrate housing a ceramic electronic function unit including two or more electrodes between which a potential difference is produced in operation.

16. A method for manufacturing a ceramic electronic component including two or more electrodes spaced at a predetermined distance from each other, between which a potential difference is produced in operation and a void that penetrates to outside is provided,

wherein a coupling agent containing fluorine is brought into contact with the void and subjected to a heat treatment after being dried.

17. The method according to claim 16, wherein the coupling agent is perfluoroalkyl alkylsilane containing a fluoroalkyl group, which is represented by the following general formula (Chemical Formula 2):

$$CF_3 - (CF_2)_n - R - SiY_q(OA)_{3-q} \quad \text{(Chemical Formula 2).}$$

(n: 0 or an integer, R: a substituent containing an alkylene group, or a Si or oxygen atom, Y: a substituent of an alkyl group, OA: an alkoxy group, q: 0, 1, or 2)

18. The method according to claim 16, wherein the heat treatment is performed at a temperature of 100 to 200°C for 5 to 60 minutes.

19. The method according to claim 16, wherein a dealcoholation reaction of perfluoroalkyl alkylsilane is caused by the heat treatment.

20. The method according to claim 16, wherein the coupling agent containing fluorine is brought into contact with the void by at least one selected from the group consisting of vapor contact, immersion under atmospheric pressure, immersion under a reduced pressure, immersion under reduced and increased pressures, and spray coating.

21. The method according to claim 16, wherein the coupling agent is diluted with a solvent.